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Laboratories and Functions

**WESTERN  
UTILIZATION  
RESEARCH &  
DEVELOPMENT  
DIVISION**

800 BUCHANAN STREET  
ALBANY, CALIFORNIA 94710

TELEPHONE: 415- 525-2244



U.S. Agricultural Research Service

U.S. DEPARTMENT OF AGRICULTURE



THE WESTERN UTILIZATION RESEARCH AND DEVELOPMENT DIVISION (WURDD) is part of the Agricultural Research Service (ARS) of the U.S. Department of Agriculture. Established in 1940, its headquarters and most laboratory facilities are located at the Western Regional Research Laboratory, Albany, California. In addition, the Division supervises three outlying stations (see address below).

Offices of Dr. George W. Irving, Jr., Administrator of ARS, and Dr. F. R. Senti, Deputy Administrator for Marketing and Nutrition Research, are in Washington, D.C. Three other regional research divisions were also established in 1940 and are located in the Eastern, Northern, and Southern parts of the United States. The Southeastern Agricultural Research Laboratory was established in 1969. Commodities assigned to each are listed on page 16.

In the WURDD, basic and applied research (chemical, physical, engineering, and economic) is directed towards these objectives: (1) to promote the utilization of farm commodities by increasing marketing efficiency and expanding exports; (2) to improve the quality of life by controlling the pollution of air and water from agricultural activities; (3) to assist in the development of rural America by promoting industry and new jobs; (4) to abate hunger and minimize the travail of poverty by improving the nutritional quality of foods and lowering their cost; and (5) to enhance the health and well-being of consumers by assuring the availability of safe, wholesome, and high quality foods.

## LOCATION AND ADDRESSES

### Headquarters

See cover for address. Albany is across the Bay from San Francisco. From San Francisco, buses to Albany leave from Bridge Terminal at First and Mission Streets. The Laboratory is just off the East Shore Freeway (Interstate 80) at the Albany interchange.

### Field Laboratories

Fruit and Vegetable Chemistry Laboratory,  
263 South Chester Avenue, Pasadena,  
California 91106

Fruit and Vegetable Products Laboratory,  
c/o Western Washington Research and  
Extension Center, Puyallup, Washington 98371

Hawaiian Fruit Laboratory,  
University of Hawaii, 1920 Edmondson Road,  
Honolulu, Hawaii 96822

February 1970

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## OFFICE OF THE DIRECTOR

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Dr. James W. Pence Assistant Director, Program Operations	2002
Mr. Robert L. Olson Assistant Director, Program Development and Appraisal	2030
Vacancy Assistant Director, Industrial Development	
Mr. I. J. Girgich Assistant to Director for Management	2012
Mr. William Takacs Assistant to Director (Patents)	3019
Mr. Orville H. Spaugh Plant Superintendent	WAB 208
Mr. John J. Meehan Assistant to Director	2032
Mr. Alan E. Goodban Assistant to Director	2028
Mrs. Dolphine A. Wilson Assistant to Director	2030
Mr. Clyde L. Rasmussen Industrial Specialist	3008
Miss Anne M. Avakian Librarian	1004
Mr. R. V. Enochian Economics Research Service	3006
Dr. Bruce E. Mackey Biometrical Services Staff	3021

## CEREALS LABORATORY

Dr. D. A. Fellers, Acting Chief	Room 3023
Functional Properties Investigations Mr. D. K. Mecham, Head	2122

Studies changes in constituents of wheat flour induced by conventional processing treatments as well as newly devised ones. Investigates the mechanisms of maturing, the contributions of sulfhydryl and other reactive groups of proteins and other constituents, and the role of enzymes in the viscoelastic properties of doughs and final character of breads and other wheat products. Investigates and uses qualitative and quantitative differences of various wheats and wheat flours to seek explanations for the unique dough properties of wheat and to find treatments for improving poor quality. Evaluates the compatability of nutritional, flavor promoting, and other ingredients in the bread making process and resulting products.

Chemical Properties Investigations Dr. D. D. Kasarda, Acting Head	2106
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Conducts research on isolation and characterization of proteins, lipids, carbohydrates, and other constituents of various parts of the wheat kernel and is concerned with interactions among them. Studies on a molecular and submicroscopic scale the nature and conformation of physical structures. Searches for relationships of chemical and physical properties of flour constituents to use in food products.

Microbiology Investigations Dr. Leo Kline, Head	1233
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Investigates fermentative activity in frozen yeast doughs, the modification of flour and wheat components by fermentation to improve functional properties, and the production of novel flavors, textures, and nutritive properties in new wheat food products by fermentation. Conducts studies on the improvement in quality and processing of bakery products and performs service test baking. Investigates procedures for controlling and eliminating hazards from microorganisms or microbial products in wheat foods.

Product and Process Development Investigations Dr. D. A. Fellers, Head	3023
---	------

Investigates changes in composition and properties



of wheat, rice, and barley constituents that result from various steps in processing. Develops new and improved wheat and rice food products and processing methods, particularly seeks greater food utilization of whole grains and milling byproducts through new and unique processes. Improves nutritional aspects of products by increasing nutrient availabilities and by development of fortification and enrichment procedures. Designs specific products for export markets. Develops methods for evaluating quality and stability; uses these and traditional methods to evaluate new and improved products. Develops low cost, highly nutritious foods from grains to alleviate hunger and combat poverty throughout the world.

## FIELD CROPS LABORATORY

Dr. G. O. Kohler, Chief	Room 3032
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Feed Processing Investigations Dr. H. G. Walker, Jr., Head	2201
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Investigates effects of raw-material composition and processing variables on the quality of feedstuffs derived from wheat, rice, and barley products and from castor, safflower, and other western oilseed meals. Develops new and improved processing treatments and food or feedstuff products with high nutritional quality that are devoid of naturally occurring or adventitious undesirable components. Develops processes for converting plant and animal wastes and residues into feeds to lessen cost of livestock products and reduce pollution.

Forage Investigations Dr. G. O. Kohler, Acting Head	3032
--	------

Investigates effects of raw-material composition and characteristics and processing variables on the quality of feedstuffs produced from legumes, grasses, and other forages. Develops new and improved methods for manufacture of processed forage feeds and feed supplements that maintain labile nutrient levels under adverse conditions and contain biologically active growth enhancement factors. Assists in application of these researches in promoting industry and jobs in rural areas.

Conducts research on the composition and chemical and physical properties of the oil from castor, safflower, and other western oilseeds. Develops new products and evaluates their utility as chemical intermediates or end products of industrial importance.

## FRUIT LABORATORY

Dr. F. P. Boyle, Acting Chief Room  
1024

Composition Investigations 1104  
Dr. J. W. Corse, Head

Conducts research on the chemical, biochemical, and physical-chemical nature of constituents of fruits which affect the quality of processed products. Tannins, pigments, and the relation of cell wall chemistry to texture are of particular interest. The naturally occurring compounds isolated in these studies (and related materials) are screened for efficacy in a variety of agricultural problem areas.

Flavor Investigations 1118  
Dr. Roy Teranishi, Head

Conducts basic research on the chemistry of the flavor components of fruits; develops methods for flavor recovery and stabilization; develops means of incorporating flavors into processed fruit products; and develops techniques for monitoring changes in flavor components during processing and storage.

Product and Process Development Investigations 1122  
Dr. J. D. Ponting, Acting Head

Develops new and improved preservation processes that enhance quality and lower costs. Determines effects of raw material and processing variables on flavor, color, texture, and nutritive value of fruit and tree nut products. Studies the microbiology and pollution aspects of fruit processing with respect to health and safety. Supervises studies in Puyallup, Washington, in cooperation with the State Agricultural Experiment Stations in the Pacific Northwest and at the University of Hawaii in cooperation with the Department of Food Science and Technology.

The unit at Puyallup, with E. R. Wolford in charge, determines processing characteristics of new varieties of fruits and vegetables and develops improved processing methods. The unit at Honolulu, with J. E. Brekke in charge, develops processing methods for Hawaiian fruits, with special emphasis on reducing transportation costs through concentration, dehydration, and other processes. Utilization of byproducts for feeds and efficient handling and use of wastes to reduce pollution are integral parts of the research effort.

## **SUBTROPICAL FRUIT LABORATORY**

263 South Chester Ave., Pasadena,  
California 91106, Telephone 796-0239

Dr. E. A. Beavens, Chief

Biochemical Investigations  
Dr. V. P. Maier, Head

Conducts research on the constituents, enzymes, and biochemical regulatory systems responsible for color, flavor, texture, and characteristic composition of citrus fruits and dates; studies the effects of geographical, varietal, and cultural variables on these systems; and applies this basic knowledge to development of new and improved products for domestic and export markets.

Plant Phenolics Investigations  
Dr. R. M. Horowitz, Head

Conducts research on the chemistry, spectral properties, biosynthesis, and metabolism of the phenolic, glycosidic, and bitter constituents of citrus; studies the relations between taste and structures of certain of these constituents.

Product and Process Development Investigations  
Dr. L. B. Rockland, Head

Conducts research on the chemical composition of dry beans and citrus oils and on changes in constituents induced by natural variables, environmental factors, and processing procedures. Develops improved processing procedures for dry beans and citrus oil products consistent with maintaining maximum nutritional value, elimination of natural toxicants and pesticide residues, improved sanitation

procedures, and reduction of pollutants in processing effluents.

## VEGETABLE LABORATORY

Dr. J. R. Wagner, Chief Room  
1030

Composition Investigations 1107  
Dr. J. F. Carson, Head

Conducts research on the chemical, biochemical, and physical-chemical nature of constituents of vegetables, including isolation, identification, and characterization of flavor components and precursors in vegetables, isolation and characterization of enzymes and enzyme substrates, and studies of biochemical factors governing their interactions. Conducts microbiological research on problems related to vegetables.

Potato Investigations 1123  
Dr. M. L. Weaver, Head

Conducts research on the nature of constituents of white potatoes, on changes in these constituents resulting from various processing treatments, and on the development of dehydrated, fried, frozen, and related potato products of improved quality, stability, and consumer appeal. Investigates possibilities for extending nonfood uses for potatoes.

Microbiology Investigations 3211  
Dr. J. C. Lewis, Head

Conducts basic and applied microbiological research on problems relating to vegetables and other food crops, including studies of the mechanism of heat resistance in bacterial spores, the elaboration of toxins by fungi, and spoilage problems in the vegetable processing industries.

Product and Process Development Investigations 1103  
Mr. W. C. Dietrich, Acting Head

Develops new and improved methods for processing vegetables, including dry beans and peas, in order to expand uses for these commodities. Studies the effects of raw material composition and processing variables on the flavor, color, texture, nutritive value, and digestibility of vegetable food products.

Investigates quality changes in fruit and vegetable products by organoleptic assay, correlates subjective evaluations of quality with objective measurements of related chemical and physical characteristics, and develops improved sensory techniques for measurement and evaluation of color, flavor, and texture of food products.

## POULTRY LABORATORY

Dr. Hans Lineweaver, Chief

Room  
3016

Poultry Meat Investigations  
Mr. A. A. Klose, Head

2136

Conducts basic research on the biochemical and physical-chemical characteristics of the lipid, protein, enzyme, flavor, and other components of poultry meat that influence quality, efficiency of processing, consumer satisfaction, and use of poultry products. Applies basic information in the development of improved processing methods and new products.

Egg Investigations  
Dr. Hans Lineweaver, Acting Head

3016

Conducts research of a chemical, biochemical, and physical-chemical nature to characterize egg composition and components. Investigates changes in composition and components of eggs and egg products induced by processing. Develops improved liquid, frozen, concentrated, and dried egg products, and develops processes for improving and extending nonfood application of inedible and low-quality eggs and components thereof.

Product Development and Evaluation Investigations  
Dr. Helen Hanson Palmer, Head

2128

Conducts research on the identification and characterization of basic formulation, pretreatment, and packaging factors that influence the stability of poultry and egg products having several ingredients. Develops information needed on ingredient compatibility to devise new or improved poultry products. Develops statistically sound sensory and objective tests needed to evaluate poultry and egg product stability.



Conducts investigations concerned with growth and death of microorganisms and their chemical, pathogenic and spoilage activities in poultry and egg products. Develops basic information on chemical, physical, and biological means of restricting microbial activity. Develops and applies new basic information on the biochemistry and physiology of microorganisms to problems associated with the production of high quality poultry and egg products.

## WOOL AND MOHAIR LABORATORY

Dr. H. P. Lundgren, Chief Room  
3014

Special Finishes Investigations 2102  
Dr. A. G. Pittman, Acting Head

Conducts research on new finishes for wool and mohair products to improve hand, strength, durable-press, shrink-resistance, and heat, soil, water, oil and flame resistance; on the discovery and synthesis of new monomers and polymers and new methods for applying finishes; on processes for chemical grafting, polymerization, and other reactions leading to improved finishing techniques and special finishes; and on processes involved in the diffusion of dyes and other finishes into wool and mohair fibers.

Fiber Chemistry Investigations 2117  
Dr. Mendel Friedman, Acting Head

Conducts research on the basic chemistry of wool and mohair proteins, their chemical composition and internal structure; on the basic chemistry of phenomena occurring in wool and mohair during storage and processing; on ways of inhibiting or minimizing undesirable changes in storage and processing; and on the correlation of chemical modification of wool and mohair with changes in fiber, yarn, and fabric properties.

Fiber Physics Investigations 2113  
Dr. Emory Menefee, Head

Investigates physical-chemical and rheological properties of wool, mohair, and other agricultural products, and associates these properties with meaningful molecular and macroscopic structural elements. Studies the relation between fiber surface and

mechanical properties and the serviceability and processing characteristics of yarns and fabrics of various constructions. Develops theory, methods, and instrumentation necessary for investigations. Uses experimental methods such as ultracentrifugation, electrophoresis, viscosimetry, stress-relaxation and stress-strain measurements, as well as standard physical tests.

Product and Process Development Investigations      WPL  
Mr. Willie Fong, Head

Conducts pilot-plant-scale research on laboratory treatments of wool and mohair to develop processes suitable for mill use. Develops new products and products of improved serviceability from modified wools and mohair and develops processes and products in cooperating industrial plants to accomplish necessary scale-up and accommodation to industrial conditions.

## CHEMICAL PHYSICS LABORATORY

Dr. Fred Stitt, Chief      Room  
3002

Analytical Investigations      3107  
Dr. R. M. McCready, Head

Applies standard macro- and micro-analytical methods to provide compositional information needed in the Division's commodity programs; modifies methods or develops new methods of analysis as required.

Crystallography and Computer Applications      3124  
Investigations  
Dr. K. J. Palmer, Head

Uses X-ray diffraction methods for determination of molecular structure or identification of crystalline materials and the degree of crystallinity and orientation of polymeric materials; determines size, shape, homogeneity, and studies interactions of macromolecules in solution by light scattering methods; and develops methods and programs for use of a time-sharing computer for on-line control of instruments and data acquisition as well as off-line data processing.

Magnetic and Mass Spectroscopy Investigations 3116  
Dr. R. E. Lundin, Head

Uses nuclear magnetic resonance and mass spectrometric methods for determination of molecular structure or identification of substances isolated in compositional and other studies, for chemical group analysis, and for analysis of mixtures; uses electron spin resonance for the detection, identification, and determination of either paramagnetic ions or free radicals; provides assistance in the design, construction, and trouble-shooting of electronic circuits.

Optical Spectroscopy and Microscopy Investigations 3108  
Dr. J. R. Scherer, Head

Uses infrared, ultraviolet, visible, and Raman spectrometric methods for determination of molecular structure or identification of substances isolated in compositional and other studies, for chemical group analysis, and for analysis of mixtures; uses optical rotatory dispersion and circular dichroism methods for determining conformation and conformational changes of optically active molecules in solution; uses chemical microscopic methods for identification and characterization of crystalline substances and for following changes involving disappearance or formation of crystalline phases; uses both light and electron microscopy to visualize at high magnifications samples of interest in relation to specific physical, chemical, or biological properties.

## ENGINEERING AND DEVELOPMENT LABORATORY

Mr. R. P. Graham, Chief Room 1032

Equipment Investigations 1032  
Mr. Edison Lowe, Head

Conducts investigations concerned with the extension of engineering knowledge essential to the development of new and better processing equipment for agricultural products. Applies such information to the design and development of specialized equipment to produce foods with improved nutritional properties and low costs, to minimize waste disposal



problems in food processing, and to assist in establishing processing operations in rural areas.

Process Investigations

1032

Mr. R. P. Graham, Acting Head

Conducts pilot plant studies to determine optimum practical processing conditions, raw materials and equipment requirements, product yields, and other factors as required for development of new and improved processes; develops new, less costly or improved products by application of novel or previously unexploited processing methods or equipment; adapts product or process developments to the circumstances of cooperative industrial feasibility trials and production demonstration; modifies food and feed processes to reduce pollution; and through adaptive research, engineers processes for application to rural industry.

Unit Operations Investigations

1032

Dr. D. F. Farkas, Acting Head

Investigates basic principles and phenomena affecting engineering operations involved in the processing of agricultural commodities; correlation of basic findings and development of mathematical and graphical expressions to represent findings; verification of the applicability of these expressions to specific process development; and engineering-economic factors affecting commercial utilization of agricultural commodities. Studies include estimation of economic feasibility of commercial development of processes, products and byproducts; interaction of agricultural engineering with cost and other economic factors; and determination of least-cost processes for developing rural areas and abating pollution.

## PHARMACOLOGY LABORATORY

Dr. A. C. Keyl, Chief

Room  
WAB 216

Toxicology Investigations

WAB 305

Dr. A. N. Booth, Head

Conducts research on the chemical changes caused by compounds investigated toxicologically. In experimental laboratory animals, determines the metabolic products of compounds administered and stud-

ies the effects of these compounds on living tissue constituents such as fats, carbohydrates, proteins, minerals, vitamins, enzymes, and hormones.

Animal Welfare Investigations  
Dr. J. M. Fuller, Acting Head

WAB 306

Provides laboratory animals for scientific investigations in conformance with the Animal Welfare Act. Maintains health of animal colonies by providing good veterinary medical practice and services.

Pharmacodynamics Investigations  
Dr. Keica Nishie, Acting Head

WAB 309

Conducts research on the actions of chemical compounds on living animal structures, the bioassay of pharmacologically active plant constituents and plant products, the acute systemic toxicity of compounds, and the possible deleterious effects of long-continued ingestion of chemical compounds.

Physiologically Active Compounds Investigations  
Dr. L. L. Layton, Head

3128

Isolates and characterizes such components of farm crops as the following: enzyme inhibitors, antigenic constituents, and antibiotics. Develops procedures to determine interactions of food additives (intentional or unintentional) and of natural constituents with normal body compounds such as proteins and enzymes. Develops methods for elimination of undesirable physiological effects of additives and natural constituents.

## **PLANT ENZYME PIONEERING RESEARCH LABORATORY**

Mr. E. F. Jansen, Chief Chemist

Room  
1130

Conducts research to develop basic knowledge in the field of plant enzyme chemistry upon which can be built entirely new or more advantageous ways to utilize plants and plant products.

## UTILIZATION RESEARCH DIVISIONS

### Western Utilization Research and Development Division

A. I. Morgan, Jr., Director  
800 Buchanan Street  
Albany, California 94710  
Telephone: 415-525-2244

Western fruits (including citrus, other subtropical, and tropical fruits); tree nuts; vegetables; poultry products; forage crops; wheat; rice; barley; wool and mohair; dry beans and peas; castor, safflower, and western oilseeds.

### Eastern Utilization Research and Development Division

I. A. Wolff, Director  
600 East Mermaid Lane  
Philadelphia, Pennsylvania 19118  
Telephone: 215-247-5800

Animal products: dairy, meats, fats, and leather; plant products: eastern fruits and vegetables, tobacco, and maple.

### Northern Utilization Research and Development Division

R. J. Dimler, Director  
1815 North University Street  
Peoria, Illinois 61604  
Telephone: 309-685-4011

Cereal grains: corn, wheat, barley, grain sorghum, and oats; oilseeds: soybean, flaxseed, and erucic acid-containing oilseeds; and new crops.

### Southern Utilization Research and Development Division

C. H. Fisher, Director  
1100 Robert E. Lee Boulevard  
(Post Office Box 19687)  
New Orleans, Louisiana 70119  
Telephone: 504-527-7544

Cotton and cottonseed; pine gum; southern fruits and vegetables; rice; peanuts.

### Southeastern Agricultural Research Laboratory

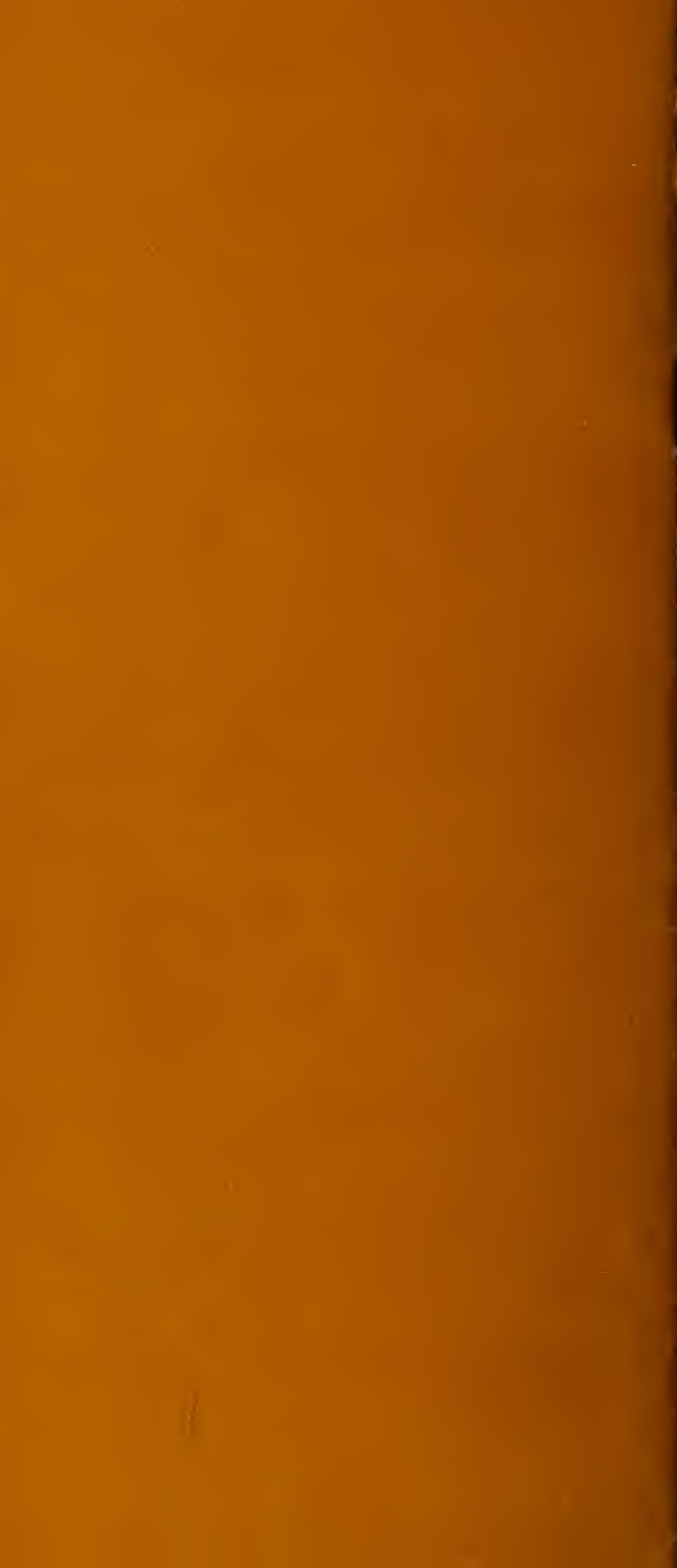
C. H. H. Neufeld, Director  
College Station Road  
P. O. Box 5677  
Athens, Georgia 30604  
Telephone: 404-546-3311

Forages and feeds; animal products; southeastern fruits, vegetables, and pecans.

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Laboratories and Functions

**WESTERN  
UTILIZATION  
RESEARCH &  
DEVELOPMENT  
DIVISION**

800 BUCHANAN STREET  
ALBANY, CALIFORNIA 94710

TELEPHONE: 415- 525-2244



**Agricultural Research Service  
U.S. DEPARTMENT OF AGRICULTURE**

**THE WESTERN UTILIZATION RESEARCH AND DEVELOPMENT DIVISION** is part of the Agricultural Research Service of the U. S. Department of Agriculture. Headquarters and most of its laboratory facilities are located at the Western Regional Research Laboratory, Albany, California. In addition the Division supervises four outlying stations (see addresses below).

Offices of Dr. Byron T. Shaw, Administrator of the Agricultural Research Service, and Dr. George W. Irving, Jr., Deputy Administrator for Nutrition, Consumer, and Industrial Use Research (including utilization research), are in Washington, D. C.

Congress in 1938 authorized four regional laboratories to conduct basic and applied research designed to expand, improve, and develop the utilization of farm crops. Crops assigned to the Western Division are shown in the table of contents, and those assigned to all four regional Divisions are listed specifically on page 14.

## **LOCATION AND ADDRESSES**

### **Headquarters**

See cover for address. Albany is across the Bay from San Francisco. From San Francisco, buses to Albany leave from the Bridge Terminal at First and Mission Streets. The laboratory is just off the East Shore Highway (U. S. Highway 40) at the Albany interchange.

### **Field Laboratories**

Fruit and Vegetable Chemistry Laboratory,  
263 South Chester Avenue, Pasadena,  
California 91106

Fruit and Vegetable Products Laboratory,  
c/o Washington Irrigation Experiment Station,  
Prosser, Washington 99350

Fruit and Vegetable Products Laboratory,  
c/o Western Washington Experiment Station  
Puyallup, Washington 98371

Hawaiian Fruit Laboratory,  
c/o Dept. of Food Science and Technology, University of Hawaii, Agricultural Experiment Station,  
Honolulu, Hawaii 96822

January 1964



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<b>Dr. C. H. Harry Neufeld</b> Assistant Director, Program Development	2026
<b>Mr. Robert L. Olson</b> Assistant Director, Program Appraisal	2030
<b>Mr. A. H. Brown</b> Assistant Director, Industrial Development	2034
<b>Mr. I. J. Girgich</b> Assistant to Director for Management	2010
<b>Mr. Ray H. Nagel</b> Assistant to Director	2032
<b>Mr. William Takacs</b> Assistant to Director (Patents)	3017
<b>Mr. Orville H. Spaugh</b> Mechanical Superintendent	1015
<b>Miss Anne M. Avakian</b> Librarian	1004
<b>Mrs. Eleanor C. Taylor</b> Technical Editor	2019
— — — — —	
<b>Mr. R. V. Enochian</b> Economic Research Service	1024
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<b>Mr. Russell T. Prescott</b> Public Information Officer	2019
<b>Mr. Clyde L. Rasmussen</b> Process and Product Evaluation Staff	1058

## CEREALS LABORATORY

Room

Dr. J. W. Pence, Chief 3023

Composition & Functional Properties Investigations  
Mr. D. K. Mecham, Head 2110

Pursues research on isolation and characterization of proteins, enzymes, and enzyme substrates in various parts of the wheat kernel. Investigates distribution of components of proteins, including enzymes among and within cells and other kernel structures, and searches for relationships of chemical properties and interactions to functional properties in food products.

Flavor Investigations  
Dr. J. W. Pence, Acting Head 3023

Isolates, identifies, and characterizes flavor and aroma components and their precursors in baked goods. Seeks new knowledge of the effects of fermentation, baking, and other processes on aroma and flavor, and of changes that may be caused by heat, light, oxidation, and other factors. Develops processing methods and ingredient compositions that improve and stabilize aroma and flavor of bread and other baked products.

New Product Investigations  
Mr. A. D. Shepherd, Acting Head 3021

Investigates changes in properties of wheat constituents that result from various steps in processing and also effects of processes on products. Develops new and improved wheat food products and processing methods. Designs specific products for export markets and for domestic use.

Rice and Barley Investigations  
Dr. H. P. Binger, Acting Head 2122

Pursues researches on the chemical nature of the constituents of rice and barley and the distribution of carbohydrate, lipid, and protein (including enzyme) components in and among various portions of the grains. Investigates the relationships between composition and performance of processed products. Develops new processes, aimed at new or improved products for food and industrial uses and at economical processing costs.

## FIELD CROPS LABORATORY

Dr. G. O. Kohler, Chief 3032

### Feeds Investigations

Dr. G. O. Kohler, Acting Head 3032

Investigates effects of raw material composition and characteristics and processing variables on the quality of feedstuffs produced from forages, wheat, rice, barley, and sugar beets, and from meals of castor, safflower and other western oil seeds. Develops methods for manufacture of new or improved feeds and feedstuffs, methods to preserve their labile nutrients under adverse conditions, and processes for the inactivation or elimination of biologically deleterious components and enhancement of those which produce favorable biological responses. Conducts research on the development of other industrial uses for forage crops and western oilseeds.

### Sugar Beet Investigations

Dr. R. M. McCready, Head 2201

Conducts research on the various properties of sugar beets, sugar beet processing liquors, and residues in order to develop improved processes for sugar manufacture and for conversion of sugar beets, sucrose, and sugar-processing byproducts into industrial chemicals and other products.

### Oilseed Investigations

Dr. Thomas H. Applewhite, Head 3032

Conducts research on the composition and chemical and physical properties of castor, safflower, and other western oilseeds. Develops new products and evaluates their utility as chemical intermediates or end products of industrial importance.

## FRUIT LABORATORY

Dr. W. L. Stanley, Chief 3006

### Fruit Composition Investigations

Dr. J. W. Corse, Head 1104

Conducts research on the chemical, biochemical, and physical-chemical nature of constituents of fruits, including isolation, identification, and characterization of flavor components and precursors, fruit enzymes and substrates, and also the chemistry of fruit pigments and their precursors.

## **Fruit Processing Investigations**

**Dr. W. L. Stanley, Acting Head**

3006

Develops new and improved methods of processing fruits and new preservation processes to improve quality and lower processing and distribution costs. Determines effects of raw material and processing variables on the flavor, color, and texture of fruit products.

Supervises Hawaiian Fruit Laboratory, which conducts processing research on Hawaiian fruits, in cooperation with the Agricultural Experiment Station of the University of Hawaii, Honolulu.

## **Pacific Northwest Fruit Investigations**

**Dr. A. M. Neubert, Head, Prosser, Washington 99350**

Conducts studies in Prosser and Puyallup, Washington, in cooperation with the State Agricultural Experiment Stations in the Pacific Northwest. At Puyallup, Mr. E. R. Wolford is in charge. This unit develops improved processing methods for new fruit and berry varieties, determines suitability of new varieties for processing, and develops new high-quality fruit products and processing methods for utilization of low-value fruits and processing wastes.

## **SUBTROPICAL FRUIT LABORATORY**

263 South Chester Ave., Pasadena,  
California 91106, Telephone Sycamore 6-0239

**Dr. E. A. Beavens, Chief**

## **Nitrogenous Constituents Investigations**

**Dr. L. B. Rockland, Head**

Conducts research on chemical composition and physical properties of tree nuts and subtropical fruits and compositional changes caused by processing operations in order to develop new products and methods of preservation.

## **Pigment Investigations**

**Dr. R. M. Horowitz, Head**

Conducts research on chemical, biochemical, and physical-chemical nature of flavonoid- and terpenoid-like constituents of citrus fruits and their

products; on chemical changes involved in quality losses while in storage; and on development of new processes to prevent such chemical changes.

#### **Flavor Investigations**

**Dr. V. P. Maier, Head**

Conducts research on isolation, identification, and characterization of flavor and related constituents of citrus oils, juices, and other subtropical fruit products; on effects of geographical, varietal, cultural, processing, and storage variables on these constituents; and on new products and methods of processing to overcome undesirable changes in present products.

### **VEGETABLE LABORATORY**

**Dr. H. K. Burr, Chief**

3006

#### **Vegetable Composition Investigations**

**Dr. J. F. Carson, Head**

1107

Conducts research on the chemical, biochemical, and physical-chemical nature of constituents of vegetables, including isolation, identification, and characterization of flavor components and precursors in vegetables; isolation and characterization of enzymes and enzyme substrates; and on biochemical factors governing their interactions. Conducts microbiological research on problems related to vegetables.

#### **Vegetable Processing Investigations**

**Dr. J. R. Wagner, Head**

1101

Develops new and improved methods for processing vegetables in order to expand food and industrial uses for these commodities, and studies the effects of raw material and processing variables on the flavor, color, and texture of vegetable food products.

#### **Potato Investigations**

**Dr. F. P. Boyle, Head**

1123

Conducts research on the nature of constituents of white potatoes, on changes in these constituents resulting from various processing treatments, and on the development of dehydrated, fried, frozen,



and related potato products of improved quality, stability, and consumer appeal. Investigates possibilities for extending nonfood uses for potatoes.

**Food Appraisal Investigations**

**Mr. D. G. Guadagni, Head**

1133

Investigates quality changes in fruit and vegetable products by organoleptic assay, correlates subjective evaluations of quality with objective measurements of related chemical and physical characteristics, and develops improved sensory techniques for measurement and evaluation of color, flavor, and texture of food products.

**POULTRY LABORATORY**

**Dr. Hans Lineweaver, Chief**

3020

**Egg Investigations**

**Dr. Leo Kline, Head**

1233

Conducts research of a chemical, biochemical, and physical-chemical nature to characterize egg composition and components. Investigates changes in composition and components of eggs and egg products induced by processing. Develops improved liquid, frozen, concentrated, and dried egg products. and develops processes for improving and extending nonfood applications of inedible and low-quality eggs and components thereof.

**Poultry Meat Investigations**

**Mr. A. A. Klose, Head**

2136

Conducts basic research on the biochemical and physical-chemical characteristics of the diverse lipid, protein, enzyme, flavor, and other components of poultry meat that influence quality, efficiency of processing, consumer satisfaction, and hence utilization of poultry products, and applies such information to development of improved processing methods and new products.

**Product Stability Investigations**

**Dr. Helen L. Hanson, Head**

2124

Conducts research on the identification and characterization of basic formulation, pretreatment, and

packaging factors that influence the stability of poultry and egg products having complex composition; on principles of formulation applicable to the development of new or improved poultry products; and on development of statistically sound sensory and correlating objective tests essential to evaluation of poultry and egg product stability.

#### **Microbiology Investigations**

**Dr. Hans Lineweaver, Acting Head**

3020

Conducts investigations concerned with (a) growth and death of microorganisms and their chemical, pathogenic and spoilage activities in poultry and egg products; (b) the development of basic information on chemical, physical, and biological means of restricting microbial activity; and (c) development and application of new basic information on the biochemistry and physiology of microorganisms to problems associated with the production of high quality poultry and egg products.

### **WOOL AND MOHAIR LABORATORY**

**Dr. H. P. Lundgren, Chief**

3014

#### **Fiber Chemistry Investigations**

**Dr. W. L. Wasley, Head**

2104

Conducts research on the composition and structure of natural and chemically modified wools and mohair to impart new and improved properties to increase their usefulness; on the correlation of various types of chemical modifications with changes in properties; on ways of inhibiting or preventing undesirable changes; and on the development of laboratory-scale processes for modifying and improving wool and mohair for specific end uses.

#### **Fiber Physics Investigations**

**Dr. K. J. Palmer, Head**

3118

Investigates the physical and molecular structure and electrical nature of wool and mohair fibers, the geometry of construction and mechanics of yarns and fabrics, and the measurement and evaluation of physical and mechanical properties of wool and mohair products at all stages of processing



for guidance of research and development studies.

Conducts physical research on other commodities, using complex instruments and equipment.

**Product Development Investigations**

**Mr. W. Fong, Head**

WPL

Conducts pilot-plant-scale research on laboratory treatments of wool and mohair to develop processes suitable for mill use. Develops new products and products of improved serviceability from modified wools and mohair and develops processes and products in cooperating industrial plants to accomplish necessary scale-up and accommodation to industrial conditions.

**ENGINEERING AND DEVELOPMENT  
LABORATORY**

**Dr. A. I. Morgan, Jr., Chief**

1030

**Equipment Investigations**

**Mr. E. Lowe, Head**

1030

Conducts investigations concerned with the extension of engineering knowledge essential to the development of new and better processing equipment for agricultural products. Applies such information to the design and development of new and specialized equipment.

**Industrial Analysis Investigations**

**Mr. G. S. Smith, Head**

1030

Investigates engineering-economic factors affecting commercial utilization of all agricultural commodities under study in the Division, including estimation of economic feasibility of commercial development of new products involving the interaction of agricultural engineering, cost and other economic factors, and competitive market situations.

**Process Investigations**

**Dr. A. I. Morgan, Jr., Acting Head**

1030

Conducts investigations that develop chemical engineering information required in the evaluation and development of processes brought under con-

sideration in the course of the Division's overall research program, and conducts pilot-plant studies to determine optimum practical processing conditions, raw materials and equipment requirements, product yields, and other information required.

**Unit Operations Investigations**

**Mr. Robert P. Graham, Acting Head** 1030

Conducts investigations on the basic principles and phenomena affecting engineering operations involved in the processing of agricultural commodities, correlates basic findings, develops mathematical and graphic expressions to represent findings, and verifies the applicability of these expressions to specific process developments.

**PHARMACOLOGY LABORATORY**

**Dr. Floyd DeEds, Chief** 3000

**Toxicological Chemistry Investigations**

**Dr. A. N. Booth, Head** 3123

Conducts research on the chemical changes caused by compounds investigated toxicologically. In experimental laboratory animals, determines the metabolic products of compounds administered and studies the effects of these compounds on living tissue constituents such as fats, carbohydrates, proteins, minerals, vitamins, enzymes, and hormones.

**Pathology Investigations**

**Dr. F. DeEds, Acting Head** 3000

Diagnoses gross and microscopic changes in the morphology of various organs of experimental animals. Develops techniques needed to facilitate the diagnosis of lesions and determines the relationship of observed lesions to compounds investigated toxicologically.

**Pharmacodynamics Investigations**

**Dr. A. C. Keyl, Head** 3119

Conducts research on the actions of chemical compounds on living animal structures, the bioassay of pharmacologically active plant constituents and

plant products, the acute systemic toxicity of compounds, and the possible deleterious effects of long-continued ingestion of chemical compounds.

**Physiologically Active Compounds Investigations**

**Dr. L. L. Layton, Head**

3128

Isolates and characterizes such components of farm crops as the following: antimetabolites, enzyme inhibitors, carcinogens, antigenic constituents, and antibiotics. Develops procedures to determine interactions of food additives (intentional or unintentional) and of natural constituents with normal body compounds such as proteins and enzymes. Develops methods for elimination of undesirable physiological effects of additives and natural constituents.

**PLANT ENZYME PIONEERING RESEARCH  
LABORATORY**

**Mr. E. F. Jansen, Chief Chemist**

1130

Conducts research to develop basic knowledge in the field of plant enzyme chemistry upon which can be built entirely new or more advantageous ways to utilize plants and plant products.

## UTILIZATION RESEARCH DIVISIONS

Utilization research on farm commodities is conducted also in three other regional Utilization Research and Development Divisions. Addresses and commodities on which the four Divisions work are:

### **Western Utilization Research and Development Division**

800 Buchanan Street  
Albany, California 94710

Western fruits (including citrus, other subtropical, and tropical fruits), nuts, vegetables, rice; poultry products; forage crops; wheat; barley; wool and mohair; sugar beets; dry beans and peas; castor, safflower, and other western oilseeds; new crops.

### **Eastern Utilization Research and Development Division**

600 East Mermaid Lane  
Philadelphia, Pennsylvania 19118

Animal products: dairy, meat, fats, and leather; plant products: eastern fruits and vegetables, tobacco, honey, maple, and new crops.

### **Northern Utilization Research and Development Division**

1815 North University Street  
Peoria, Illinois 61604

Cereal grains: corn, wheat, barley, grain sorghum, and oats; oilseeds: soybean, flaxseed, and erucic acid-containing oilseeds; and new crops.

### **Southern Utilization Research and Development Division**

1100 Robert E. Lee Boulevard  
(Post Office Box 19687)  
New Orleans, Louisiana 70119

Cotton and cottonseed; tung fruit; pine gum; southern fruits and vegetables including citrus, sweetpotatoes, and cucumbers; sugarcane; rice; peanuts; and new crops.

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